tween the ice and the meteorological conditions based upon the last 10 years of the ice patrol work. Difficulty has been experienced in securing meteorological records from critical points on the Greenland and North American coasts.

It is unfortunate that there are not several year-round meteorological stations in northern regions. Besides the advantage which might be derived from their records, as just indicated, they might also serve as ice observation posts. If a station could be located somewhere along the side of the arctic drift where it sweeps in close to the shore, for instance at Cape Dyer, Baffin Land, it could serve the double purpose of a meteorological station and an ice observation post. The situation may be likened to that of a river. Flotsam observed upstream in the current will later appear at the river mouth. In this case the Labrador Current is the river whose mouth is in the vicinity of the Great Bank of Newfoundland; the flotsam is the icebergs. It takes approximately five months for a berg passing Cape Dyer to appear south of the 45th parallel. If the record of the number of bergs, with dates of passing Cape Dyer, were known to the ice patrol and the Hydrographic Office, long range forecasting of ice conditions in the North Atlantic would probably be possible. It would prepare us to meet and deal with a situation about which to-day we lack advance information.

POLAR ICE-DRIFT AND SUN SPOTS.

By GEORGE NICOLAS IFFT, American Consul.

[Bergen, Norway, Dec. 6, 1922.]

An interview with Dr. Adolf Hoel expressing doubt of the possibility of Amundsen's plan for drifting over the North Pole in the *Maud* with the supposed drift of the polar ice is attracting much attention throughout Norway and causing considerable discussion in the Norwegian press. Doctor Hoel, who is lecturer on geology at the Christiania University and who during the summer headed a government research expedition to Spitzbergen and the surrounding waters (see my report on "The Changing Arctic," transmitted under date of October 10, 1922), suggests that such drift over the pole would be possible, if at all possible, some years hence, upon the theory that the polar region is subject to fixed periodic changes and that such period affecting ice conditions is one of from 10 to 11 years closely connected with the known sun-spot periods.

Doctor Hoel states that the fact of the ice drift from the northern coasts of Asia and America across the pole to the strait between Spitzbergen and Greenland and then south along the east coast of Greenland has been shown by the drift of the *Jeanette* and other vessels. Amundsen's experience last year, however, seemed to indicate that the ice drift is subject to variations. At all events, the *Maud* did not succeed in getting into the drift because of unfavorable ice conditions and Doctor Hoel argues that it is reasonable to assume, either, that the exceptionally favorable ice conditions now prevailing at Spitzbergen are due to the fact that the polar current is weak and that the unfavorable ice conditions on the Asian and American north coasts are due to such cause or, that the ice in those regions actually moves in an opposite direction from that in which it has been believed to move.

Dr. H. T. Hesselberg, director of the Norwegian Meteorological Institute, discussing such suggestion, states that there can hardly be talk of a 10 or 11 year ice period in the polar seas without having submitted such theory to a thorough investigation and without a thorough study of the comparatively scanty material at hand. In regard to a relation between polar ice conditions and sun-spot periods, he said that the influence of sun spots is felt in so many conditions, among them atmospheric conditions, that it is not impossible that they also play their part in ice conditions about the pole. At the same time, he considers Doctor Hoel's statement of the utmost interest, as he is thoroughly familiar with conditions in that section of the world.

A REVIEW OF GEOPHYSICAL MEMOIRS NO. 19.[1]

By ALFRED J. HENRY.

[Weather Bureau, Washington, D. C., Dec. 28, 1922.]

The latest *Memoir* of the British Meteorological Office is a welcome contribution upon a subject of very great interest from both a theoretical and a practical viewpoint. It is peculiarly appropriate that this discussion of tropical cyclones should come from the English Meteorological Office, since it was Piddington, an Englishman, who first gave the name cyclone to the revolving storms of the Bay of Bengal more than half a century ago.

The raison d'être of the *Memoir* was an inquiry originating with the Colonial Secretary as to the visitation by tropical storms to the various dominions beyond the seas. Naturally the Meteorological Office was called upon to prosecute the inquiry. Obviously one of the first steps was to assemble in convenient form the enormous mass of widely scattered material from the original sources. The accomplishment of this object was entrusted to Mrs. E. V. Newnham, M. Sc., a member of the professional staff of the forecast division. How well she accomplished this difficult task may be seen by a perusal of the 102 closely packed quarto pages of text and charts.

The *Memoir* includes, in addition to the material collected by Mrs. Newnham, an introduction by Sir Napier Shaw, to which reference will be made later, and a short discussion by Dr. Harold Jeffreys on "Theories on the Origin of Tropical Cyclones."

The observational material is presented in four sections, each one dealing with those portions of the great oceans which are subject to visitation by tropical cyclones. These are:

(1) North Atlantic: A. West Indian Hurricanes.
B. Squalls and Tornadoes of West Africa.
(2) Indian Ocean: A. Cyclones of the Bay of Bengal and the Arabian Sea.
B. Cyclones of the South Indian Ocean.
(3) Pacific Ocean: A. Typhoons of the North Pacific.
B. Revolving Storms of the South Pacific.

The material is presented in great detail with many rather full extracts from the original papers. Thirty-three full page plates with numerous inserts illustrate the paper.

[1] Hurricanes and Tropical Revolving Storms, by Mrs. E. V. Newnham, M. Sc. With an introduction on The Birth and Death of Cyclones. By Sir Napier Shaw, F. R. S. pp. vi. 122 illus. H. M. S. O., 1922. Price 12s. 6d.